

REMARKS

In view of the above amendments and following remarks, reconsideration and further examination are requested.

By the current Amendment, non-elected claims 58-76, 80-82, 87 and 93 have been cancelled, claims 50, 86 and 88 have been amended, and new claims 94-124 have been added. Also, the paragraph bridging pages 32 and 33 of the specification has been amended so as to more clearly state the operation that is depicted by Figure 5E. No new matter has been added.

The Examiner rejected claims 77, 83, 86 and 88 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. And, claims 39-57, 77-79, 83-86 and 88-92 were rejected under 35 U.S.C. § 103(a) as being unpatentable over a plurality of references for a variety of reasons.

With regard to the 35 U.S.C. § 112, first paragraph, rejection, claims 86 and 88 have been amended to delete therefrom the language that the Examiner has construed to be new matter. Accordingly, it is respectfully submitted that the 35 U.S.C. § 112, first paragraph, rejection of claims 86 and 88 should not be maintained.

The 35 U.S.C. § 112, first paragraph, rejection of claims 77 and 83 is respectfully traversed for the following reasons.

With regard to claims 77 and 83, the Examiner has taken the position that there is no support for correcting the warping of the electronic component. This position is respectfully traversed, in view of the fact that correcting warping of the electronic component is supported by the original specification at page 29, lines 20-25. In this regard, lines 20-25 on page 29 of the original specification state

The IC chip 1 is warped with a concave portion located around the center of its active surface. By pressurizing this with a heavy load of not smaller than 20 gf in the bonding stage, the warp and undulation of both the board 4 and the IC chip 1 can be corrected.

Accordingly, because the original specification does provide support for correcting the warping of the electronic component, it is respectfully submitted that the 35 U.S.C. § 112, first paragraph, rejection of claims 77 and 83 should also not be maintained.

The 35 U.S.C. § 103(a) rejections are also traversed for the following reasons.

In accordance with a first aspect of the invention, a significant feature of the instant invention is that hardening of the thermosetting resin, used to bond the electronic component to the circuit board, and correcting of warping of the circuit board are achieved at approximately **the same time**. This feature is believed to be clearly brought out in each of independent claims 39 and 52. In this regard, each of these claims recite

...hardening, with heat, said thermosetting resin interposed between said electronic component and said circuit board, while achieving mutual pressing between said electronic component and said circuit board...during...correcting of any warping of said circuit board.

In accordance with a second aspect of the invention, another significant feature of the instant invention is that leveling of bumps, used to electrically interconnect electrodes of the electronic component and electrodes of the circuit board, also occurs approximately **simultaneously** with the afore-mentioned hardening of the resin and correcting of warping of the circuit board. This feature is believed to be clearly brought out in independent claim 39. In this regard, claim 39 recites

...hardening, with heat, said thermosetting resin interposed between said electronic component and said circuit board, while achieving mutual pressing between said electronic component and said circuit board...during leveling of said bumps and correcting of any warping of said circuit board.

It is respectfully submitted that the simultaneous performance of hardening the resin, leveling the bumps, and correcting warping of the circuit board is not taught or suggested by any of the references relied upon by the Examiner.

In the Office Action mailed February 14, 2001, the Examiner took the position that

Murakami teaches at least 20 gf per bump force. Col. 5, line 47, where it is stated that the semi-conductor is pressed under heating

therefor the leveling, correcting and the hardening are achieved at the same time or simultaneously. As the bumps are deformed, the leveling occurs. The corrections that Applicant is trying to claim are inherent to the process of Murakami.

This position has never been retracted by the Examiner, and accordingly, it is presumed that the Examiner continues to stand by this position.

In column 5, lines 46-47 of Murakami, reference is made to FIG. 3D and it is stated that the semiconductor device 105 is pressed under heating to the circuit substrate 101. In column 3, lines 26-39, reference is made to FIGS. 2A and 2B and it is stated that the semiconductor device 105 is pressed to the circuit substrate 101, and **then** the sealing resin 109 is hardened by heating. Each of FIGS. 2A, 2B and 3D correspond to the same embodiment. Accordingly, what Murakami can teach with regard to this embodiment, in a light most unfavorable to Applicant, is that pressure is initially applied to the semiconductor device 105 so as to press this device to circuit substrate 101 and deform or level the bump electrodes 107, and then, after a passage of time, heat is for the first time applied so as to harden the resin 109. During application of this heat, the pressure continues to be applied. This is the only reasonable interpretation that allows column 5, lines 46-47 to be consistent with column 3, lines 26-39.

Accordingly, in Murakami, because the bump electrodes 107 are leveled before heat is applied, the bump electrodes are leveled before the resin 109 is hardened. This is contrary to what is required by claim 39, i.e. that hardening of the resin and leveling of the bumps occur at the same time. Thus, while the Examiner can arguably support a position that application of pressure and heat occur simultaneously in Murakami based on column 5, lines 46-47, this is not by itself sufficient to demonstrate that the bump electrodes 107 are leveled at the same time the resin 109 is hardened. Indeed, when the passage at column 5, lines 46-47 is read in context with the passage at column 3, lines 26-39, as it must be since each passage pertains to the same embodiment, it is clear that the bump electrodes 107 are leveled before the resin 109 is hardened. Tsukagoshi et al. '542, Grupen-Shamansky and Matsubara et al. do not resolve this deficiency of Murakami, and accordingly, claim 39 and its dependent claims are allowable.

Additionally, with regard to claim 39 and claim 52, it is respectfully submitted that the Examiner has improperly found that "the corrections that Applicant is trying to claim are inherent to the process of Murakami". Presumably, the "corrections" the Examiner is referring to is the correction of warping of the circuit board. However, it is respectfully submitted that the Examiner has not met his burden with regard to supporting an inherency rejection.

In this regard, it is well settled and stated in M.P.E.P. § 2112 that

the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic....in relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.

Accordingly, with regard to claims 39 and 52, that warping of the circuit board 101 of Murakami may possibly be corrected when practicing the method thereof is not sufficient to demonstrate that correcting of warping of the circuit board is indeed inherent when performing the method of Murakami. Rather, the Examiner must provide some rationale or reasoning as to why correcting of warping of the circuit board of Murakami will necessarily result when practicing the method thereof. The Examiner has failed to provide such rationale or reasoning, and has otherwise failed to demonstrate that the operations performed by Murakami will necessarily result in correcting of warping of the circuit board of Murakami. None of the other references relied upon by the Examiner teach or suggest that correcting of warping of the circuit board would inherently result while performing the method of Murakami, and accordingly, claims 39, 52 and their dependent claims are allowable.

For analogous reasons, claims 77 and 83 are believed to be patentable in their own right.

Additionally, claims 94 and 118 are also believed to be patentable in their own right, since these claims recite that commencement of the application of heat occurs simultaneously with commencement of the application of pressure. Such simultaneous commencement is significant in that it allows for the electronic component to be mounted to the circuit board in a more time efficient manner.

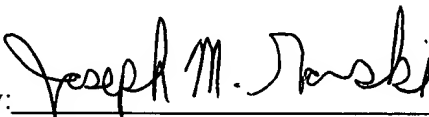
Murakami fails to teach or suggest that commencement of the application of heat occurs simultaneously with commencement of the application of pressure. Indeed, as expressed above, column 3, lines 26-39, clearly establish that the application of heat is commenced only after pressure has already been applied for a period of time, and thus, commencement of the application of heat does not occur simultaneously with commencement of the application of pressure.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early Notice of Allowance is earnestly solicited.

If after reviewing this Amendment, the Examiner believes that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the Applicant's undersigned representative by telephone to resolve such issues.

Respectfully submitted,

Kazuto NISHIDA

By: 

Joseph M. Gorski
Registration No. 46,500
Attorney for Applicant

JMG/edg
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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